Public Private Partnerships:
The Impact Of Risk Transfer On Sustainability

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Project Submitted In Partial Fulfillment Of

The Requirements For The Degree Of

Master Of Business Administration

The University Of Northern British Columbia

April 2006

ABSTRACT

The suggestion that public private partnerships (P3s) allow for an optimal transfer of risk is pervasive in P3 literature, yet there is very little research that investigates the impact of risk transfer on sustainability. Because P3s are typically long-term contracts, they are by nature exposed to a high level of risk and uncertainty. As a result of this exposure and the lack of information that exists regarding risk transfer in Canadian P3s, the question arose as to whether there exists model of risk transfer that leads to greater sustainability.

A literature review was completed to determine whether or not a recommended model of risk transfer exists. This literature review focused on the compilation of data primarily from Australian and United Kingdom sources, due to the longer period of experience with P3s in those jurisdictions. A recommended risk transfer model was developed.

To determine whether or not methods of risk transfer in Canada follow this model, information regarding risk and risk transfer was collected through contact with key senior personnel having involvement in a range of Canadian P3 projects. These participants represented projects over ten industry sectors, several Provinces, and included projects that involved various levels of government. The information provided by the participants was collated and compared to the recommended risk transfer model.

The data identified that although 35% of the projects studied did follow the recommended risk transfer model, 65% of the projects did not follow the model. However, only 9% of projects studied failed, leading to the conclusion that there are many different risk models that lead to the success and sustainability of Canadian P3 projects.

Further, there is a requirement to address the unique needs and characteristics of each model in order to allocate risk in a manner that maximizes the chance of the project's ability to sustain over the duration of the partnership contract.

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ACKNOWLEDGEMENT

Many thanks to my Advisors Rick Tallman and Tom Berekoff
for their time, guidance, and patience
as I tackled this project.

INTRODUCTION TO P3s

Overview

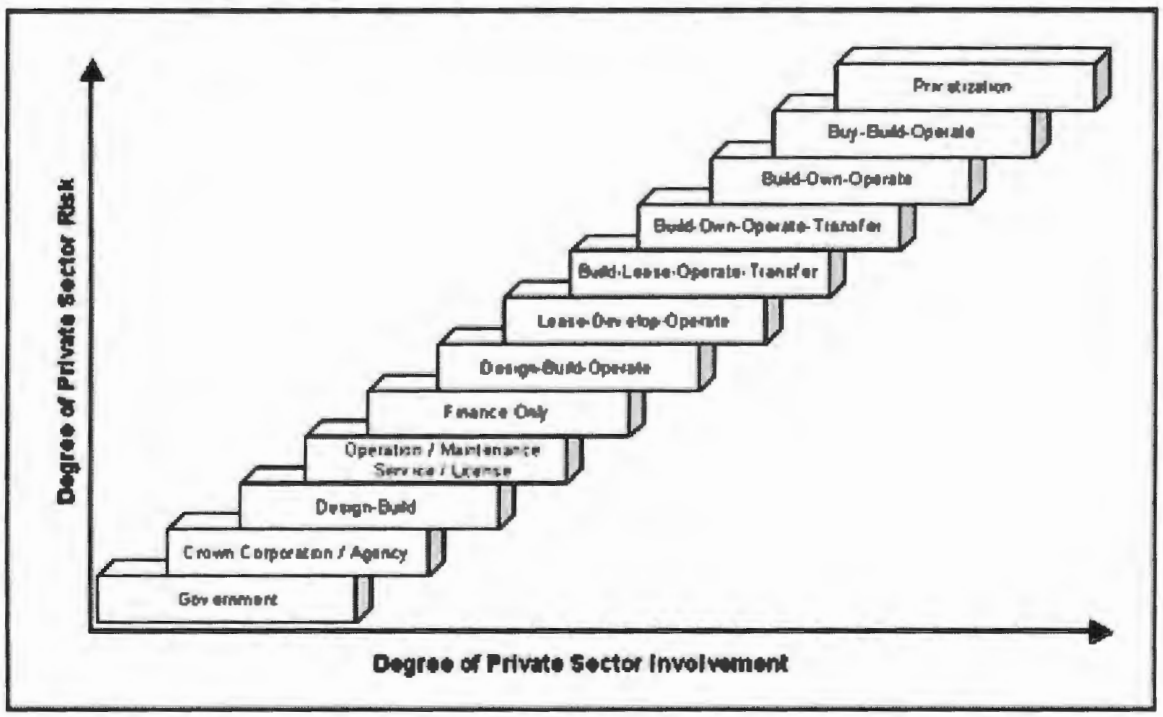
Public private partnerships, commonly referred to as "P3s", are models for providing infrastructure and/or services by combining the strengths of both the public and private sector. Many different definitions of P3s exist. As defined by the Canadian Council for Public Private Partnerships (CCPPP), a P3 is "a cooperative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards". Industry Canada defines the P3 as "a legal arrangement between two or more parties who have agreed to work collaboratively towards shared or compatible objectives and in which there is shared authority and responsibility, joint investment of resources, allocated or shared liability and risk-taking, and mutual benefits". Partnerships British Columbia defines P3s as "a legally binding contract between government and business for the provision of assets and the delivery of services". In many situations, involvement in a P3 moves the public sector from being a direct provider of services, to being a procurer of services (24).

Variation in P3 Models

Figure 1 is a visual representation of the spectrum of public and private sector involvement. This spectrum ranges from strictly government-provided services (bottom left), to complete privatization (top right). The more private involvement relative to public involvement, the closer the P3 is towards the fully privatized end of the spectrum, and vice versa. Figure 1 is not a complete list of the various models of P3s that exist, and

is included only to convey the idea that P3s exist in many different forms, and involve different degrees of public and private sector involvement. A P3 could include any combination of public and private involvement in the design, build, finance, and operation tasks involved with the provision of facilities and/or services.

Figure 1: Spectrum of Public Private Partnership Models



Source: Canadian Council for Public Private Partnerships

The "contracting-out" relationship is the foundation of the P3, and is not a new concept. For example, traditional contracting out of construction could be a government retaining a construction company to build a recreation centre. In this case, the contractor is simply the builder and is not involved in the recreation centre in any capacity that extends beyond its construction. Traditional contracting involves little transfer of

responsibility and control, and limited involvement of the contracted party in decision-making. In this respect P3s have been in existence for quite some time, as there are many examples of a public entity contracting out services. However, the past 10 years has seen this traditional contracting relationship change so that the contractor may now be involved in a much more significant manner.

Recent P3 Developments in Canada

The specific elements that characterize recent P3 development in Canada are

1) contracting out a larger number of the tasks
2) the allocation of two or more of those tasks to a consortium of partners
3) allocation of the financing task to the private partner (34)

These elements have changed the traditional contracting-out relationship. In the traditional contract relationship there is minimal long-term involvement, and the contractor is not an active investor in the development of the project. However, by contracting out a larger number of the tasks to a consortium partnership, participants may take an interest in aspects of the project that traditional contracting would ignore.

For example, if the public partner contracts with a private partner to design, build, operate, and finance the facility, the private partner is involved for a longer period of time and has an ongoing financial investment in the project.

Also, the consortium partnership is able to take advantage of their specialized expertise and realize efficiencies that may not be possible if each member were to work independently of one another. For example, an engineering firm, a construction company, a service provider and a financial services firm may join forces and form a consortium to partner with the public body. Rather than a traditional linear allocation of

tasks, this consortium can now bundle these tasks together and provide opportunities for collaboration that create efficiencies between the various project tasks.

Table 1 further outlines some of the differences between traditional outsourcing, and a partnership model of service delivery.

Table 1: A Comparison of Out-tasking and Partnering

Out-tasking	Partnering
• Typically involves farming out discrete tasks or services • No change in culture is required by the public sector organization • Can help level peak and valleys in workload • Client-supplier relationship • Client directs the work of the supplier	• Comprehensive service delivery which could include a stream or entire line of business • Change in culture is required • Partnership relationship • Client & service provide work collaborative • Integration of systems and processes
• Limited to no integration of systems or processes • Limited to no risk transference • Short-term arrangement • Easily changed or cancelled • Control on "HOW" the work is being done • Management intensive	• Risk transference • Long-term arrangement • Must include mechanisms for change and more difficult to cancel • Control on the "WHAT" is being done • Focus on performance and appropriate monitoring

Source: P3 Public Sector Readiness Assessment Guide, Industry Canada 2003

Though these new developments in P3 practices are already fairly established in the UK, New Zealand and Australia, they only began to emerge in Canada in the mid 1990s. Some of the more high profile P3s in Canada include the Confederation Bridge (1999), the 407 Electronic Toll Road in Southern Ontario (1998), and the Charleswood Bridge in Winnipeg (1995).

Although P3 infrastructure projects have gathered more public attention, P3s can also include provision of services that do not involve capital projects such as data management and road maintenance. Table 2 identifies 100 P3s by sector, that occurred in

Canada between 1998-2001, which include among others, airports, education, healthcare, recreation, and transportation projects.

Table 2:

100 P3's in Canada 1998-2001

Sector	Federal	Provincial	Municipal	Other	% of Projects
Airports & Civil Navigation	3		1		4%
Education	1	3	1	2	7%
Environmental-Air Quality		1	2		3%
Environmental-Waste			11		11%
Environmental-Water			10		10%
Healthcare		2		2	4%
Human Resources		1		1	2%
Information Technology		10	3	2	15%
Inventory Management	1				1%
Justice/Corrections		1	1		2%
Land Development & Revitalization			4		4%
Ports & Seaways	1		1	1	3%
Property Management	4	1	2		7%
Recreation			9		9%
Research	2	1			3%
Transportation	1	3	6		10%
Utilities		1	4		5%
Percentage of Projects	**13%**	**24%**	**55%**	**8%**	**100%**

Source: Public Private Partnerships in Canada: Successes, Opportunities and Challenges, 2004

Canada's political structure involves three levels of government (federal, provincial and municipal), each of which is free to develop its own processes and procedures for establishing P3 structures (38). Although some provinces have developed organizations to develop P3 expertise and support best practices (Partnerships BC is an example), Canadian P3s are largely assessed on a case-by-case basis. Without a centralized framework or set of guidelines, Canada has many structures and uses many approaches to P3 development. Despite the lack of regulatory support in Canada

(although the development of more P3 organizations has helped to improve this situation), the push to pursue P3s continues.

The Push Toward P3s

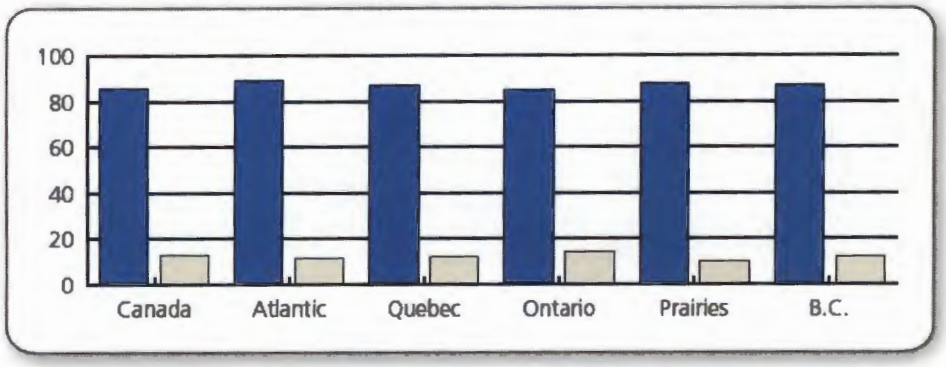
There is great pressure for increased services, and infrastructure development in Canada. For example, healthcare, transportation systems, and recreation facilities are all in high demand. Though it is difficult and sometimes controversial to estimate the exact infrastructure deficit in Canada, researchers have estimated it to be between 50 and 125 billion dollars (5). Results of a national survey conducted by the CCPPP (36) show that more than 8 in 10 Canadians believe that all 3 levels of government are having difficulty keeping pace with the demand for public infrastructure and services (see Figure 2).

As well, there is increased pressure to improve service delivery, and meet the ever-changing needs of the Canadian population. In response to these pressures, governments are searching for ways to meet this demand despite their limited budgets. For example, Ilcan et al (7) have determined that lease-back arrangements with private capital repaid over 30 years (a hypothetical time frame), avoid immediate increases in taxes and don't increase the public sector borrowing requirement. They argue that governments have essentially become consumers of private industry due to pressures that require more and more flexibility to promote the efficiency and competitiveness required in today's global marketplace (7). Due to these pressures, governments are continuously looking to alternative service delivery methods that "improve the delivery of government services to clients by sharing governance functions with individuals, community groups, and other entities" (7). It is also worth noting that P3s are highly compatible with the

user-pay concept where project costs are borne by users rather than more general forms of taxation.

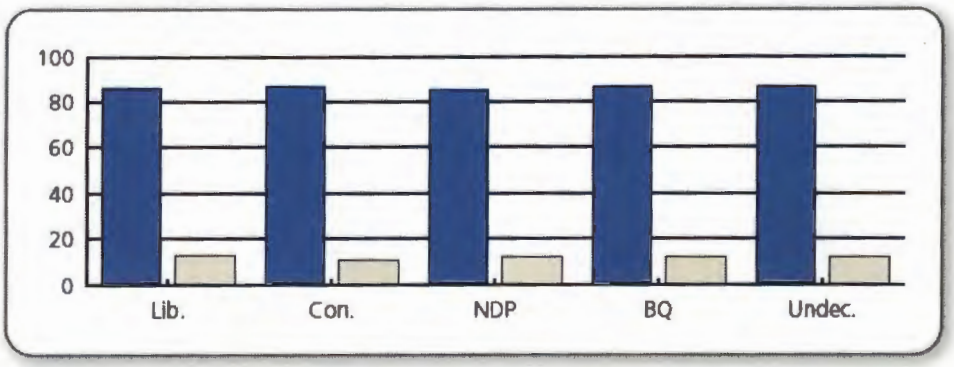
Figure 2: Results of a National Survey on Canadian Infrastructure Deficit

More than eight out of ten Canadians believe that their national, provincial and municipal governments are having trouble keeping pace with the demand for new or improved public infrastructure – roads, hospitals, schools, public transit systems, power stations, water and wastewater treatment facilities and so on.



Agree	86	89	87	85	88	87
Disagree	13	11	12	14	10	12

The concept of the "infrastructure deficit" resonates across the board, from British Columbia to the Maritimes, regardless of the whether people live in a city, town or rural area and irrespective of the political party they support – Liberal, Conservative, NDP or Bloc Quebecois (see below).



Agree	86	87	85	87	87
Disagree	13	11	12	12	12

Source: The People Speak on P3, CCPPP 2004

The Promise of P3s

The primary argument in support of P3s is that "value for money" can be achieved through leveraging private sector competencies, and allocating the risks involved to the party that is best able to manage this risk (40). Value for money is determined by comparing the lifetime cost of infrastructure/service provision if provided entirely by the public sector, to the lifetime cost of providing the infrastructure/service through a combination of public and private sector partnership.

The argument behind P3s is that the public's value for money over the lifecycle of the project can be enhanced by combining the strengths of both public and private sectors. Life cycle costing refers to the consideration of costs incurred throughout the duration of the project's life span or contract period. Life cycle costs can be reduced by partnering because the public sector is able to take advantage of the private sector's specialized expertise, productivity, efficiency, economies of scale and flexibility.

The British Columbia Guide for Local Government (23) summarizes that the "underlying logic for establishing partnerships is that both the public and the private sector have unique characteristics that provide them with advantages in specific aspects of service or project delivery – the most successful partnership arrangements draw on the strengths of both the public and private sector to establish complementary relationships". For example, the private sector can offer efficiencies such as economies of scale, and development and use of innovative technologies that can improve the quality and level of services while at the same time reduce the costs of providing the services. Further

benefits can result from increased employment and growth, thus achieving even greater value for money.

The Opposition to P3s

However, P3s and their claims do not exist without criticism. Among all arguments against P3s, a loss of government control is perhaps most often cited. The sharing of decision-making between partners leads to concern regarding which partner controls the delivery of service (22). Ill-thought partnership agreements result in confusion and unclear lines of responsibility. However, this potential exists in any partnership arrangement and cannot be isolated to a P3 structure.

Opponents of P3s also cite poor accountability in comparison to conventional service delivery, which then leads to mistrust and skepticism of the public's ability to fulfill its mandate and respond to the needs and demands of its citizens. It is argued that if a limited number of private partners respond to a Request for Proposals, the lack of competition will instill doubt that services can be provided at the optimum value for money. Further, if a bias in the selection process is perceived this will only increase public mistrust.

As described by De Bettignies and Ross (34), many P3 critics are public sector unions who view P3s as an attempt by the public sector to shift work to private sector firms which then offer lower compensation, and thus an inferior quality of service.

Despite the critics of P3s, the results of a 2004 national survey on attitude conducted by the CCPPP (an organization run by both public and private representatives), claim that 6 out of 10 people agree it is time to allow the private sector to deliver services in partnership with the public sector (36).

P3s and Sustainability

P3 contracts have varied between 5-40 years in duration period. However the current trend is towards a contract period of 15-35 years. The duration of a project agreement will depend on a number of factors such as the anticipated length of service/operational life, the period for which the service is required, and how changeable is the required technology (22).

Due to the increasing number of tasks the private partner assumes in a P3 relationship, contract periods are often based on the timeline required in order for partners to realize a return on their investment. In a design/build project the return on investment may be realized in the relatively brief time it takes to design and build the project, and the time associated with terms of warranty. However, in a design/build/operate project it may take the duration of a 30 year contract before the desired return on investment can be achieved by either party.

Thus, it is essential that the project remain sustainable for the duration of the contract period.

There are two elements considered when defining "sustainability" of a P3: the project itself must be sustainable to ensure that the desired infrastructure and/or service is provided to the public, and the partnership must endure to ensure that the service outcomes and financial returns desired by each party are achieved. Given that the maintenance of the P3 structure requires both the partnership and the project to endure,

all further reference to sustainability refers to the ability of the infrastructure/service as well as the partnership relationship to last for the duration of the contract period.

For the purposes of this paper, sustainability is used as the primary measure of P3 success.

Although the Canadian Council for Public-Private Partnerships recognizes many P3 projects that are leaders in innovation and are very successful, not all P3 projects have been sustainable. Proposed P3 projects have been discontinued during the process of negotiation, and existing P3 projects have failed several years into the partnership contract. The Ontario Health Coalition, supported by the Canadian Union of Public Employees, has published a report titled "Flawed, Failed, Abandoned", which cites 100 P3 projects that have not succeeded, or are flawed. Though the information provided in the publication is quite limited, many projects cited describe P3s that have provided poor value for money, involved managerial conflict between partners that prevented adequate project management, and involved labour conflict issues that hampered the quality and effectiveness of service provision.

RISK AND P3s

Overview

Inherent in all projects is risk. Project risk refers to circumstances that have a negative effect on the benefits the project expects to gain (22).

Changes in labour demographics, market demand, future funding levels, political power, and global competition are examples of risk that can have a negative effect on

projected benefits, especially when projections are made for extended periods of time, as in many P3 projects. Table 3 presents many different types of risks that could be faced in a project. P3 projects can involve many combinations of risk depending on their nature and the level of partnership involvement.

Table 3: Examples of Project Risk

Types of Project Risk	
Construction risk	The risk that the construction of the physical assets is not completed on time, to budget and to specification.
Demand (usage) risk	The risk that demand for the service is lower than planned
Design risk	The risk that the design cannot deliver the services at the required performance or quality standards in the output specifications.
Environmental risk	The risks that the project could have an adverse environmental impact which affects project costs not foreseen in the environmental impact assessment (EIA)
Financial risk	The risk that the private sector overstresses a project by inappropriate financial structuring.
Force majeure risk	An unanticipated unnatural or natural disaster such as war, earthquake or flood of such magnitude that it delays or destroys the project and cannot be mitigated
Inflation risk	The risk that actual inflation differs from assumed inflation rates
Legislative risk	The risk that changes in legislation increase costs. This can be sub-divided into general risks such as changes in corporate tax rates and specific ones which may discriminate against P3 projects.
Maintenance risk	The risk that the costs of keeping the assets in good condition vary from budget.
Occupancy risk	The risk that a property will remain untenanted - a form of demand risk.
Operational risk	The risk that operating costs vary from budget, that performance standards slip or that the service cannot be provided as per output specs.
Planning risk	The risk that the implementation of a project fails to adhere to the terms of planning permission, or that detailed planning cannot be obtained, or, if obtained, can only be implemented at costs greater than in the original budget.
Policy risk	The risk of changes of policy direction not involving legislation.
Residual value risk	The risk relating to the uncertainty of the value of physical assets at the end of the contract.
Technology risk	The risk that changes in technology result in services being provided using non optimal technology.
Volume Risk	The risk that actual usage of the service varies from the level forecast.

Source: The Public Sector Comparator, Industry Canada, 2003

Sustainability and Risk

The requirement of a P3 to be sustainable over the contract period exposes the project to greater risk, especially considering the move towards entering into contracts of 15 - 35 years. Risks are greater because the requirement to mitigate risk over a significant length of time decreases the level of certainty with which risk can be predicted. For example, while labour supply and demand can be reasonably predicted within a five year time frame, it is much more difficult to anticipate factors that may affect labour supply twenty years into the future.

The requirement of a P3 to be sustainable for many years results in a greater likelihood that the risks identified and transferred at the onset of a P3 will change. Internal growth and development of the project and partnership may also require changes that affect policies, roles and responsibilities, governance, and restructuring needs of the project, all of which can result in project default if not properly managed. The very nature of a partnership involves risk such as turnover of key partners and/or roles of partners, as a result of each having their own interests and mandates which are susceptible to change over time.

The indeterminable nature of future demand, revenues, political and economic climate, and social needs creates many challenges to accurate forecasting of risks involved in each project, the probability of which risks may occur, and mitigation methods and efforts that may be required.

The identification, analysis, quantification and allocation of risks often proves to be the most controversial aspect in pursuing a P3, as each partner has a different perspective regarding time, risk, and decision-making. Though not specific to P3s, the Enterprise Risk Management (ERM) model offers a general framework for managing

project risk and can be used as a guideline for identifying risks involved in a P3 project. Several Canadian P3 guidance documents such as Industry Canada's "P3 Public Sector Readiness Assessment Guide" (16) also offer general guidelines for identifying and assessing risk. Regardless of the method used, risk identification and assessment is a necessary step towards determining how risk should be transferred to ensure that value for money can be achieved.

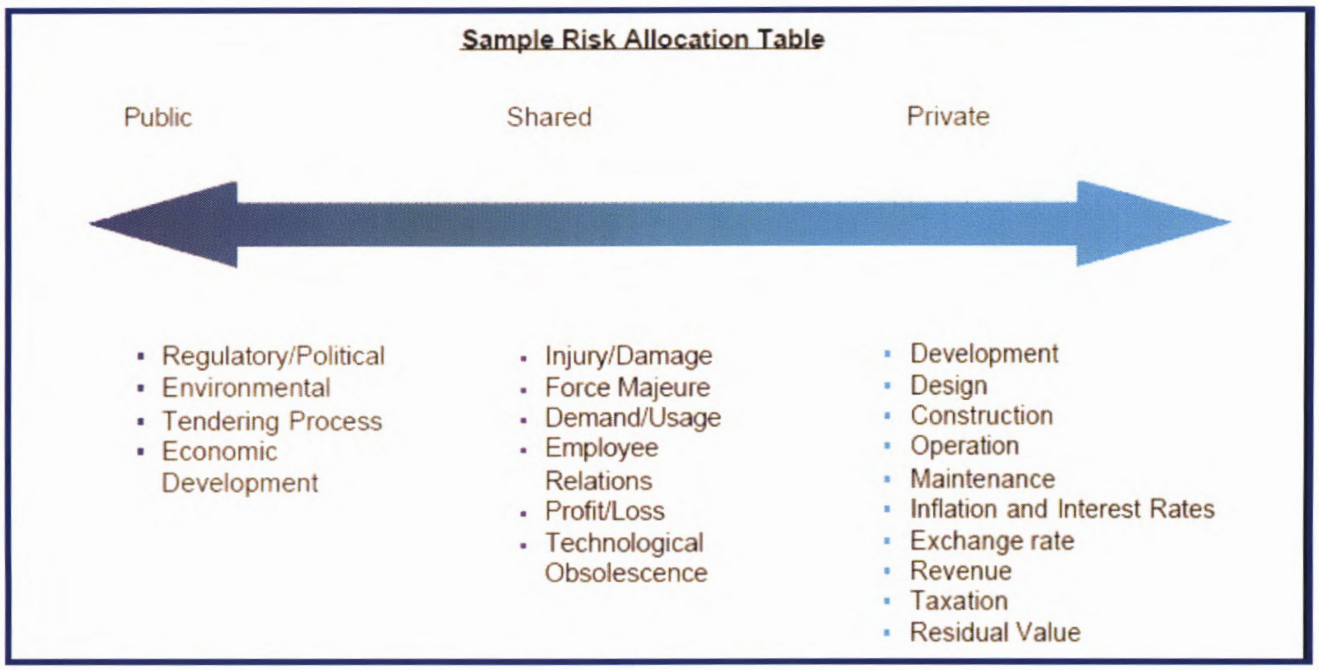
Risk Transfer and/or Sharing of Risk

Once identified, project risks can be broadly classified into three categories: retained risk, transferable risk, and shared risk.

Retained risk is that which the public partner is willing to accept, transferable risk is that which the public partner seeks to allocate to the private partner, and shared risk is that which is shared between both the public and the private party. As discussed, this transfer and/or sharing of risk is a primary motivator to engage in a P3 because it enables the transfer of risk mitigation responsibility to the partner best able to control, manage, and mitigate this risk leading to greater value for money. For example, the public sector may not have experience or expertise in managing the risks associated with changing technology, and to assume this risk would cost more than if the risk were mitigated by a partner who has considerable expertise in this area. For all partners involved, the objective of their investment is the achievement of a reasonable rate of return. With respect to the management of risk, the return gained by acceptance of this risk must adequately compensate for all mitigation efforts and costs.

Table 4 displays a hypothetical example of the risk that may be shared or transferred in a P3 project.

Table 4: Sample Risk Allocation Table



Source: Public Sector Readiness Assessment Guide, Industry Canada

Determination of Risk Transfer

Though it is not unheard of for a private partner to initiate a P3, this has not been the case in most Canadian P3 projects. The following discussion regarding risk transfer assumes that the public partner has initiated the P3, and is thus in the position of evaluating how much risk it wishes to transfer to the public partner, share with the public partner, or retain within the public sector.

The determination of whether risk is transferable or should be retained by the public sector is based on an evaluation of the relative benefit/cost to the public and private partners. The mitigation of risk is costly, though these costs can be reduced if risk is borne by the partner best able to manage and mitigate the risk. If the risk is allocated to the wrong partner, costs can escalate unnecessarily. For example, if the private partner

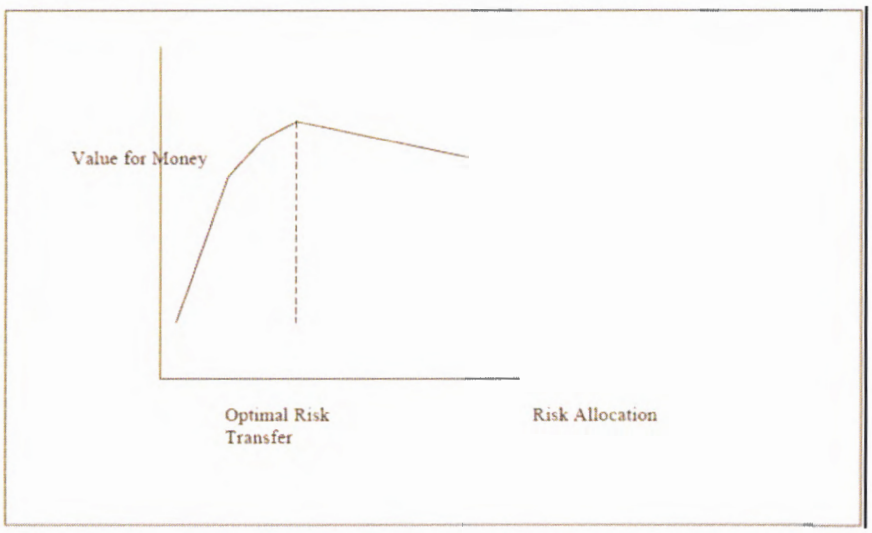
is not accustomed to mitigating geotechnical risk, it will likely require a greater return (premium) in order to accept this risk. However, if the public partner has significant geotechnical experience, it may be able to mitigate this risk much more cost effectively. Therefore, if the geotechnical risk were to be transferred to the private partner, the associated costs could escalate unnecessarily. The decision to retain risk is based on the same premise: it is retained if the public sector is best able to manage and mitigate the risk.

Shared risk occurs when the public partner determines the base level of risk it is willing to assume, and allocates risk above that level to the private partner. In some cases, risk is shared when there is a perceived social and political responsibility placed upon the public sector, such as the protection of public safety. Risk may also be shared if it is determined that the risk cannot be controlled more effectively by one partner or the other, but rather through a combination of efforts.

Ultimately, the goal of the P3 is to reduce the overall project risk by allocating risk to the partners best able to mitigate this risk, as achieving optimal risk allocation has a large impact on the P3 promise of value for money. Generally, the private sector is regarded as "having a greater ability to deliver more innovative products more quickly, with more flexibility, and at lower cost" (34). The Public Sector Comparator (38) refers to a UK survey of project managers across a number of sectors, which indicates that risk transfer is considered "a primary value for money driver in partnership projects". In this study, it was determined that efficient risk transfer provided approximately 60 per cent of total costs savings achieved through a P3 relationship.

Figure 3 illustrates the principle of optimal risk transfer: an efficient transfer of risk (indicated by the vertical dotted line), allows government to obtain the greatest value for money. However, if too much risk or the wrong risks are transferred to the private sector (indicated by portion of the line sloping down to the right), it may diminish the value for money that could be gained if these risks were retained (38).

Figure 3: Principles of Optimal Risk Transfer



Source: The Public Sector Comparator, A Canadian Best Practices Guide 2003

There is still debate as to how much risk should be transferred from the public to the private sector in P3 partnerships (23). The Canadian Guide to Public-Private Partnerships (22) states that in practice, risk allocation is influenced by policy considerations, public interest, and the negotiating ability of the parties involved.

The combination of the P3's promise to enhance the public's value for money, the requirement of both the project and partnership to be sustainable, the unregulated nature of P3s in Canada and the method of transferring risk to achieve efficiencies all leads to

the question of whether certain patterns of risk transfer have led to greater sustainability in P3s.

THE RESEARCH PROBLEM

Overview

The suggestion that P3s create an environment for an optimal transfer of risk is pervasive in P3 literature, yet there is very little research available regarding the manner in which risk transfer impacts sustainability. Based on the literature review conducted, it is clear that sustainability is required in order for a P3 project to endure over what is commonly a 15-35 year contract period. Because of the long-term nature of P3 projects and the lack of a centralized regulatory framework in Canada, P3s are by nature exposed to a high level of risk. Since risk transfer has been noted to be a primary generator of the "value for money" attraction to the P3 structure, the question arises as to whether there is a pattern of risk transfer that leads to greater sustainability.

The awareness of the various models that exist within the scope of P3s, the need for the partnership and the P3 project to be sustainable, and the way that the management of risk impacts sustainability, leads to the question of how risk transfer influences a P3 project. Understanding that P3s in Canada have had various levels of success in terms of sustainability, is there a risk transfer model that leads to greater sustainability?

Research Question

"Is there an optimal model of risk transfer that can improve the sustainability of a P3"

Premises

1. Risk is inherent in all projects.
2. The transfer and/or sharing of risk (ultimately reducing overall risk) is a primary motivator to engage in a P3.
3. The requirement of a P3 to be sustainable over long contract terms exposes the P3 to greater risk than short-term projects.
4. Not all P3s have been sustainable.

DEFINING A RECOMMENDED RISK TRANSFER MODEL

Overview

Literature regarding P3s and risk transfer recommends passing risk to the partner who is best able to mitigate the risk. For example, construction risk should be transferred to the private partner if it is determined that the private partner has a greater ability to mitigate and control this risk. However, beyond this general guideline, Canadian literature regarding P3s and risk transfer is extremely limited, and the same is true regarding research from the United States. As a result, a recommended risk transfer model has been developed using material that articulates recommendations as per P3 experiences in the United Kingdom and Australia.

Among the materials used to develop a risk transfer model are the 2004 UK document entitled "The allocation of risk in PPP/PFI construction projects in the UK" (31), which recommends the preferred risk allocation in UK construction projects. In addition, a 2001 Partnerships Victoria (Australia) document entitled "Risk Allocation and Contractual Issues" (30) provided a risk matrix that identified risk allocation

recommendations to public partners. These recommendations are based on the preferred position of the government, and offer guidance to the public sector regarding how each of these risks may be best addressed while recognizing that each project has unique features (30). The Partnerships Victoria document was compiled using information and lessons gleaned from both UK and Australian P3 experiences, and the recommendations are meant to be generic enough to be applied to most industry sectors that become involved in P3 arrangements.

Recognizing the shortage of risk transfer resources within Canada, and the experience and learning that the UK and Australia have gained due to their longer history with P3 arrangements, UK and Australian recommendations regarding risk transfer were used to establish a model for risk transfer.

Scope of Risk Transfer Model

Literature has been reviewed to collate recommendations regarding which partner should assume which type of risk. The range of risks identified for inclusion in the model has been limited to ensure a reasonable scope for this study, and to ensure the applicability of the recommendations considering the recent history of P3 development in the Canadian context.

The four principle tasks in a P3 project are:

1) defining and designing the project
2) financing the capital costs of the project
3) building the physical assets (if required)
4) operating and maintaining the assets in order to deliver the product/service (34)

To develop a recommended model of risk transfer, the risks associated with the above principle tasks of a P3, and risks associated with technology were selected. These risks: design, construction, financing, operating, maintenance and technological, have been chosen due to similarities in their definitions across geographic boundaries, as well as the likelihood that a combination of these risks will occur in most P3 projects.

Design Risk

Design risk is the risk that the design of the facility is incapable of delivering the services at anticipated cost, or is not fit for its intended purposes and uses as specified in the project agreement (30). The consequences of this risk occurring are the possibility that service cannot be provided adequately or at all, and/or that the provision of services incurs higher costs than originally intended. For example, if a software project is designed to provide access to a designated number of databases, yet results in the capacity to access only 70% of these databases, the service cannot be provided as intended.

The responsibility for design and the transfer of associated risks depends on the model of P3. In many situations, the parameters and specifications of design are determined by the public partner, and the private partner is required to complete the specifications of design within the guidelines set out by the public partner. In these situations, it is the responsibility of the private partner to design the project within the parameters and specifications that are given. Both Partnerships Victoria and Partnerships UK recommend that design risk be held fully by the private partner, provided that the public sector does not change the initial parameters and specifications during the design process. Should the public partner change these specifications, it is recommended that

the public partner assume the risks that are associated with these changes, such as delay and cost overruns. In general, public partner involvement in the design of the project should be limited to providing clear functional requirements for particular areas, in order to allow the private sector to determine how best to manage the risks involved. If the public sector imposes detailed obligations on the private party, "the risk allocation is jeopardized, as is the private party's ability to make decisions about how to best manage these risks (30)".

Construction Risk

Construction risk occurs when circumstances prevent the project from being constructed according to schedule, and on budgeted cost. The consequences of this risk occurring are delay of project construction, and construction costs that exceed the original estimates. For example, an increase in material costs can increase production costs, and environmental changes or a limited availability of supplies can result in construction delays.

Generally, construction risk has been transferred to the private sector through use of fixed price, turnkey contracts (13). However, regardless of whether the contract is fixed price, it is still recommended that this risk be transferred completely to the private partner due to its experience, access to resources, and ability to control and mitigate this risk. The private partner is thus responsible for managing its own costs, constructing the project within the required time period, and for delivering all specifications and performance standards as per terms of the contract. Should the price of building materials increase, the private partner then assumes any additional costs incurred. In a situation where the reliability of equipment and materials is acknowledged to be new and

unproven, warranties and performance guarantees may be required of the private sector (30). In most cases, inflation risk is also assumed by the private partner, which is required to mitigate this risk through various hedging strategies. If neither the public nor private party is in the position to control or manage this risk effectively, and the risk cannot be transferred to a third-party such as an insurer, the risk should remain with the originator of the construction project (2).

Financing Risk

Financing risk is the risk that when "debt and/or equity is required by the private party for the project, it is not available in the amounts and on the conditions anticipated" (30). The consequence of this risk occurring is that the funding to complete the project or to progress through the stages of project development is not available. For example, if the private partner cannot secure the required financing as agreed upon, and the development of infrastructure is largely dependent on their capital investment, the project may cease development until further capital can be secured.

This risk is commonly mitigated through financial guarantees such as performance bonds. Where the private partner supplies full or partial financial capital, the public partner usually requires guarantees and recourse financing to secure financing ability. However, it is also important to recognize that the financial contributions of each partner may change as the negotiation process evolves. For example, if the transfer of risk to the private sector requires payment of a significant premium to accept these risks, it may subsequently be difficult for the private partner to secure financial arrangements with lending institutions. As a result, they might not have the ability to provide capital funding as originally anticipated. However, once the financial contribution of the private

partner is fully confirmed and clarified in the terms of the contract, it is recommended that all financial risk be transferred to the private partner.

The private partner may also seek mitigation for risks associated with the public partner's inability to meet its financial obligations. Similar to the interests of the public partner, the private partner is unlikely to invest significant time and resources into a project unless any required public funding is in place (13). The private partner can use similar mitigation strategies to ensure financial ability and commitment from the public partner.

Operating Risk

Operating risk is defined by Partnerships Victoria as "the risk that the private party is unable to provide the required operating services, becomes insolvent or is later found to be an improper person for involvement in the provision of these services, or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure". For example, performance standards may be below project specifications due to an inability to attract qualified employees, which then results in an unanticipated increase in labour costs and decreased quality of services. The consequence of this risk occurring is that service can no longer be provided by the private partner, or cannot be provided as per specifications set out by the public partner.

Generally, this risk is somewhat mitigated through the competitive procurement process by requiring previous experience and financial stability guarantees. Performance guarantees may also be embedded into the partnership agreement through the use of non-financial evaluation criteria such as quality of service (30).

The recommended allocation is complete transfer of risk to the private partner with one exception: that risk associated with changes in output specification outside of the agreed upon specification range is assumed by the public partner (30). For example, if the service is not performed as per agreed upon specifications, the private partner assumes all responsibility for efforts required to mitigate this situation. However, should there be changes in the original specifications agreed to by the public partner, the risk associated with these changes should also be mitigated by the public sector.

Maintenance Risk

Maintenance risk is defined as "the risk that design and/or construction quality is inadequate resulting in higher than anticipated maintenance and refurbishment costs" (30). The consequences of this risk occurring is that cost increases over the life of the project are greater than originally anticipated, and depending upon the severity of maintenance required, that services are adversely affected. For example, if a court surface of a recreation complex gymnasium becomes unsafe and requires unanticipated repair, this would result in a disruption of services as well as unplanned cost overruns.

It is also recommended to transfer maintenance risk completely to the private party (30). Typically, the private party will mitigate this risk through long-term subcontracts with qualified and experienced sub-contractors.

Technological Risk

Technological risk is defined as the risk of "the contracted service and its method of delivery not keeping pace, from a technological perspective, with competition and/or public requirements" (30). The consequence of this risk is ineffective and inefficient

service delivery which results in increased costs and/or loss of revenue to competitors. For example, a wastewater treatment plant may benefit from implementing a new control technology that though not required by regulation, could enhance the cost effectiveness of services they can offer. By not proceeding with the new control technology, they ignore potential cost-savings that may arise by implementing the technology.

The recommended allocation of technology risk is quite similar to that of design, in which the private partner should assume all risk, barring regulatory changes, in which case the risk should be borne by the public partner. In the case where a contingency is anticipated, it is not uncommon for the public and private partner to contribute to a reserve fund to enable future anticipated technological enhancements.

Links to Sustainability

Design is linked to sustainability due to the requirement to meet specific functional requirements. Should the design not permit the construction of infrastructure or delivery of services as anticipated, the goals and intent of the project will not be realized. In addition, if the intended product or service cannot be realized, there are significant implications for projected operating revenues and expenses of the project. For example, if a toll highway intended to support a large flow of traffic is designed poorly and its capacity is reduced, projected revenues will also be reduced, thus negatively impacting the project's ability to meet associated financial, social, and economic demands. It is in the interest of the party assuming design risk to anticipate as best as possible, the future use and demand for the product/service. While not necessarily a requirement of design as per the terms of the contract, this will enable the project to have some flexibility in terms of adapting to different future demand patterns, uses, and

amendments to the original design requirements, which could impact the level of sustainability of the project.

Similar to design risk, construction risk is a critical component of risk management because it influences the future of the project. Proper construction enhances the ability to forecast future revenue or maintenance requirements, and impacts the ability of the project to expand or reduce operating requirements in the future. For these reasons, construction risk has a significant impact on the project's ability to be sustainable, as it provides a framework for future project development and maintenance. This link to sustainability is not strictly tangible; there are qualitative impacts that cannot necessarily be quantified. For example, in order for a project to be sustainable, both social and political support of the project must occur throughout the project's life. This places responsibility upon the private partner constructing the project to ensure that it meets the society's social and political requirements both in current and anticipated social/political climates.

With respect to sustainability, financial risk clearly impacts the ability of a project to be developed, and to sustain itself over the duration of the contract. Where the private partner is involved in project operation, the ability to meet its debt obligations is based upon a projected revenue stream; later cash flows represent a significant proportion of the overall net present value and the calculation of value for money. In this situation, there is a built-in incentive for the private partner to provide operating requirements efficiently and effectively in order to meet their financial obligations. This is also a primary reason that P3 contracts are often found to be 20-30 years in length: the partners require this length of time period to generate anticipated returns. In this respect, it is clear that

financial risk has a significant impact on the sustainability of a P3 project, and the partnership.

When private partners are also involved in the design, build, and operation of a P3, their return on equity may be based on operating revenues, thus cessation of service is a substantial risk if operating revenues are not realized. In this respect, operating risk presents a significant hurdle to sustainability. If the project does not provide the anticipated service, the project will not be sustainable. A significant strain on the partnership will likely result, provided the reason for cessation is within the private partner's control. To maximize the potential for sustainability, it is critical that operating performance standards are clearly articulated in order to prevent ambiguities and different interpretations between parties, and that future service demands are considered. If these standards are unclear, the public party may be locked into contracting a deficient level of service over a long contract term (30).

As with construction risk, maintenance risk is linked to sustainability through the need of the project to provide the agreed upon services, and to do so in a timely and cost-efficient manner. As infrastructure ages, the need for effective maintenance mitigation strategies also increases. The existence of long-term contracts provides incentive to the party assuming the maintenance risk to maintain the assets so they will last the duration of the contract if not longer, with minimal unanticipated cost.

With respect to sustainability, technology can be a more critical in certain industry sectors than others. For example, if the project is a wastewater treatment facility, it can be reasonably anticipated that over the duration of a 20 to 30 year contract there will be significant regulatory, technological, environmental and capacity changes

that will require significant facility expansion and upgrades. In this situation, it would be likely that a reserve fund would be built into the terms of the contract to ensure provisions were made for these eventualities. Regardless, technological advancements occur rapidly, and over such long-term contracts a project must consider which partner is in the best position to manage this risk in order to maximize the sustainability of the project.

Table 5: A Recommended Risk Transfer Model

Project Risk	Definition	Recommended Transfer to Private Sector
Design	the risk that design of the facility is incapable of delivering the services at anticipated cost, or is not fit for its intended purposes and uses as specified in the project agreement	Private partner except where the public partner mandates change outside of agreed upon specifications
Construction	the risk that events occur during construction which prevent the facility being delivered on time or on cost	Private partner except where provision is specifically granted under the contract (ex. force majeure)
Financing	the risk that when debt and/or equity is required by the private partner for the project it is not available then and in the amounts and on the conditions anticipated	Private Partner
Operating	the risk that the private partner is unable to provide the required operating services, becomes insolvent or is later found to be an improper person for involvement in the provision of these services, or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure	Private Partner
Maintenance	the risk that design and/or construction quality is inadequate resulting in higher than anticipated maintenance and refurbishment costs	Private Partner
Technological	risk of the contracted service and its method of delivery not keeping pace, from a technological perspective, with competition and/or public requirements	Private partner except where contingency is anticipated and the public partner agrees to share risk by funding a reserve

An adaptation from Partnerships Victoria, Risk Allocation and Contractual Issues, 2001

A Recommended Risk Transfer Model

Table 5 is a recommended risk transfer model, which suggests the preferred allocation of risk transfer from the public sector's point of view.

METHODOLOGY

Overview

To compare the risk transfer model to the method of risk transfer used by Canadian projects, data was collected via interviews with key informants associated with Canadian P3 projects. The 2001 CCPPP publication entitled "100 Projects: Selected Public-Private Partnerships Across Canada" (1) was used to generate key informant contact information. While there are numerous Canadian projects that have been initiated within the past 2-3 years, this resource provided the most comprehensive guide to projects that had been in existence since the mid 1990s, when P3s entered their "new" phase of development. Projects contacted were not limited in any way with respect to industry sector or type of infrastructure and/or service provided. Because this publication was 5 years old, many contact numbers were no longer valid, and alternate contacts could not be found. In some cases, key informants had retired and were not able to be contacted.

Contact with 63 key informants was attempted. Successful contact was made with 38 key informants. Of these 38 contacts, 24 interviews were conducted for a return rate of 60.5%. One interview discussed a project that was still in initial negotiation stages: this interview was discounted leaving a total of 23 interviews considered valid.

Of the 23 valid interviews, 21 projects had sustained, and 2 projects had failed. Key informants were primarily public sector representatives who held various key positions in the development and ongoing management of the P3s in which they were involved. Participants represented many different sectors including waste management and wastewater treatment, healthcare, service delivery, information technology, ports & seaways, corrections, recreation, transportation, and education. In addition, participants represented projects located across Canadian Provinces:

New Brunswick	2
Nova Scotia	2
Ontario	10
Alberta	3
British Columbia:	6

A total of 12 different P3 models were described in the interviews, ranging from those which bundled two functions such as Operation & Maintenance, to models which bundled several functions such as Design, Build, Finance, Operate, Own, and Transfer.

Interviews were semi-structured, conducted by telephone, and occurred in March 2006. The length of each interview ranged between 16 – 57 minutes. The purpose of the interviews was to collect information specific to the allocation and transfer of risk for each project. Informal semi-structured interviews were used to permit a greater degree of participation between the interviewer and participants, and to allow for a greater dialogue than independently completed surveys. This dialogue was also meant to trigger the memory of participants in the event that details regarding risk transfer might not have been easily accessible. In addition, the semi-structured format allowed participants to offer information regarding risk and sustainability, perhaps not included in the original

structure of the interview, but which were critical factors in their projects' development and sustainability.

The following interview questions were used to guide the discussion regarding risk transfer and sustainability:

- Why did the project become a P3?
- Is the project still operating as a P3?
- How did you identify the risks involved with the project?
- Did you quantify the value of each risk? If so, how did you do this?
- How did you determine which risks to transfer?
- How did the transfer of risk contribute to the Project's "value for money" proposition?
- How do you think risk transfer impacted the sustainability of the Project?
- Has the allocation of risk changed at all since the initial contract was signed?
- Are there any other comments that you have regarding possible links between risk transfer and the success/failure of a P3 project?

These questions were chosen to understand the context in which risks were assessed, the basis upon which risk transfer was determined, and the impact of risk transfer on the project's sustainability. Participants were also asked to identify the amount of each risk transferred to the private sector using Table 6. This table was developed to acknowledge that risk can be shared between the public and private sector, and is not always fully transferred or retained.

Public partners were contacted because the risk transfer model developed was based on literature that recommends risk transfer from the public perspective. However, if the public partner contact could not be reached an attempt was made to contact the private partner. In some cases however, private contact information was unavailable, and in other cases the research was directed back to the public partner. Two interviews were conducted with a private partner representative. In one case the interview was discounted due to the fact that the project is currently under negotiation and has not been finalized as

a P3 project. The other case has been included in the results, though primarily, the results reflect the perspective of the public partner.

Table 6: Risk Allocation Table - Data Collection

Project Risk	Definition	% Risk Transferred to Private Sector (out of 100%)
Design	the risk that design of the facility is incapable of delivering the services at anticipated cost, or is not fit for its intended purposes and uses as specified in the project agreement	
Construction	the risk that events occur during construction which prevent the facility being delivered on time or on cost	
Financing	the risk that when debt and/or equity is required by the private party for the project it is not available then and in the amounts and on the conditions anticipated	
Operating	the risk that the private party is unable to provide the required operating services, becomes insolvent or is later found to be an improper person for involvement in the provision of these services, or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure	
Maintenance	the risk that design and/or construction quality is inadequate resulting in higher than anticipated maintenance and refurbishment costs	
Technological	risk of the contracted service and its method of delivery not keeping pace, from a technological perspective, with competition and/or public requirements	

Thus, the data collected is not representative of private sector feedback; the relationship between risk transfer and sustainability in the data collected represents primarily the views and opinions of the public partners involved, and not necessarily those of the private partners.

All participants were provided with a letter that outlined the nature of the study, the use of information collected, and confidentiality assurances. Any concerns regarding

the study were addressed prior to commencing the interview. To ensure that no project could be identifiable, participant names, project names, and specific location remain confidential. All data collected was recorded by the researcher, and will be removed from her database at the end of April 2006. Participants were provided with the questions and risk allocation table prior to each interview being conducted, in order to facilitate a comprehensive discussion, and to minimize errors that could result from various interpretations of the risk definitions that may be used across Canada.

The information collected from the interviews was used to analyze and compare the recommended risk transfer model to how risk has been transferred in Canadian projects. In addition, the data collected helped to identify any trends in the relationship between how risk has been transferred, and the sustainability of Canadian P3 projects.

Limitations

Legislative differences may impact the way P3s are structured in different provinces and municipalities, thus it is difficult to determine the influence of regulatory and legislative standards on the method of risk transfer. As previously mentioned, the study contacted primarily public sector representatives, therefore the data collected and analyzed is specific to the public partner perspective.

Definitions of each risk were clarified to minimize errors in interpreting the meaning of each risk. However, it is likely that these definitions were still subject to some interpretation error due to the various meanings these terms may have held in individual project negotiations across Canada.

Finally, the risks that comprise the recommended risk model were chosen due to the ability to apply these risks to many different models of P3s, and the generic nature of

their definitions. As a result, any interactions and influences between these and other risks have not been assessed.

1. RESULTS

Risk Transfer Model Comparison

Table 7 summarizes the results of the data collection, and identifies the extent to which risk was completely transferred, retained, or shared in each project contacted. Given that the risks involved in each project differ, not all participants were able to comment regarding each risk. For example, an Operation & Maintenance P3 does not involve risk associated with design and construction. Thus, only those risks which apply to the type of contract received comment.

The results indicate a tendency to follow the recommended risk transfer model with respect to design, construction, financing and operation, however this tendency moves somewhat further from the model with respect to maintenance and technology risk.

Tables 8 and 9 summarize key information collected from the interviews.

Table 7: Risk Transfer Model Comparison – Data Collection

Project Risk	Definition	Recommended Model of Risk Transfer	Risk Transfer Results (based on 23 interviews)
Design	the risk that design of the facility is incapable of delivering the services at anticipated cost, or is not fit for its intended purposes and uses as specified in the project agreement	Private partner except where the public partner mandates change outside of agreed upon specifications	**77%** transferred risk completely to private partner **23%** of projects shared this risk
Construction	the risk that events occur during construction which prevent the facility being delivered on time or on cost	Private partner except where provision is specifically granted under the contract (ex. force majeure)	**71%** transferred risk completely to private parnter **29%** of projects shared this risk
Financing	the risk that when debt and/or equity is required by the private party for the project it is not available then and in the amounts and on the conditions anticipated	Private Partner	**73%** transferred risk completely to private partner **27%** shared this risk
Operating	the risk that the private party is unable to provide the required services, becomes insolvent or is later found to be an improper person for involvement in the provision of these services, or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure	Private Partner	**68%** transferred risk completely to private partner **32%** shared this risk
Maintenance	the risk that design and/or construction quality is inadequate resulting in higher than anticipated maintenance and refurbishment costs	Private Partner	**56%** transferred risk completely to private partner **44%** shared this risk
Technological	risk of the contracted service and its method of delivery not keeping pace, from a technological perspective, with competition and/or public requirements	Private partner except where contingency is anticipated and the public partner agrees to share risk by funding a reserve	**47%** transferred risk completely to private partner **53%** shared this risk

Table 8: Selected Data - Interview Summary

Project	Model	Length of Project		Province	Method of Risk	% of Risk Transferred to Private Sector						Sustainability	
		Since Initiated	Total years		Identification	Design	Construction	Finance	Operating	Maintenance	Technological	Succeeded	Failed
1	OM	2000-present	5	ON	informal	n/a	n/a	n/a	100	50	50	X	
2	BOO	1960's-present	45	ON	none	100	100	100	100	100	100	X	
3	DBLOT	1999-2006	7	BC	formal	100	100	100	50	100	100		X
4	DBD	1999-present	6	BC	informal	100	100	n/a	n/a	0 (after 2yrs)	n/a	X	
5	DBO	2001-present	4	BC	formal	100	100	n/a	100	50	50	X	
6	BO	1998-present	7	NB	none	-	100	n/a	100	100	100	X	
7	DBO	1996-2002	6	BC	informal	-	-	-	-	-	-	X	
8	DBO	1997-2002	5	ON	informal	-	-	50	100	-	100	X	
9	DBFO	1999-2005	6	ON	informal	100	100	50	100	100	100		X
10	DBO	1998-present	7	ON	none	-	-	-	-	50	50	X	
11	FO	1997-present	8	AB	none	-	-	0	0	-	0	X	
12	OM	1998-2005	7	AB	none	n/a	n/a	n/a	60-70	80	-	X	
13	OM	2001-2004	5	ON	formal	n/a	n/a	n/a	100	50	50	X	
14	DBFOOT	1997-present	8	BC	informal	50	90	100	95	75	75	X	
15	DBFOOT	1992-present	13	ON	formal	75	95	50	80	90	50	X	
16	DBFOO	2003-present	2	BC	formal	100	100	100	100	100	100	X	
17	OM	1998-present	7	ON	formal	n/a	n/a	n/a	100	60	-	X	
18	DBFO	1997-present	8	NS	formal	90	80	-	25	0	0	X	
19	DBFO	1996-2003	7	NS	formal	100	100	100	100	100	100	X	
20	DBFO	1998-present	7	ON	formal	100	50	100	100	100	75	X	
21	OM	2000-present	5	AB	formal	n/a	n/a	n/a	100	100	50	X	
22	BFO	1993-present	12	NB	formal	100	100	100	100	100	100	X	
23	BOOT	1999-present	6	ON	formal	100	100	100	90	100	50	X	

Average P3 duration (years)	8.4
Median P3 duration (years)	7

Design	D	Lease	L
Build	B	Operate	O
Transfer	T	Maintain	M

Own	O
Finance	F

Table 9: Selected Data - Interview Summary Organized by P3 Model

Model	Duration of Project		Province	Method of Risk	% of Risk Transferred to Private Sector						Sustainability	
		Total years		Identification	Design	Construction	Finance	Operating	Maintenance	Technological	Succeeded	Failed
DBD	1999-present	6	BC	informal	100	100	n/a	n/a	0 (after 2yrs)	n/a	X	
BO	1998-present	7	NB	none	-	100	n/a	100	100	100	X	
BOO	1960's-present	45	ON	unknown	100	100	100	100	100	100	X	
BOOT	1999-present	6	ON	none	100	100	100	90	100	50	X	
BFO	1993-present	12	NB	formal	100	100	100	100	100	100	X	
DBO	2001-present	4	BC	formal	100	100	n/a	100	50	50	X	
DBO	1996-2002	6	BC	informal	-	-	-	-	-	-	X	
DBO	1997-2002	5	ON	informal	-	-	50	100	-	100	X	
DBO	1998-present	7	ON	informal	-	-	-	-	50	50	X	
FO	1997-present	8	AB	none	-	-	0	0	-	0	X	
OM	2000-present	5	ON	informal	n/a	n/a	n/a	100	50	50	X	
OM	1998-present	7	ON	formal	n/a	n/a	n/a	100	60	-	X	
OM	2001-2004	5	ON	formal	n/a	n/a	n/a	100	50	50	X	
OM	1998-2005	7	AB	informal	n/a	n/a	n/a	60-70	80	-	X	
OM	2000-present	5	AB	formal	n/a	n/a	n/a	100	100	50	X	
DBLOT	1999-2006	7	BC	formal	100	100	100	50	100	100		X
DBFO	1999-2005	6	ON	informal	100	100	50	100	100	100		X
DBFO	1998-present	7	ON	formal	100	50	100	100	100	75	X	
DBFO	1997-present	8	NS	formal	90	80	-	25	0	0	X	
DBFO	1996-2003	7	NS	formal	100	100	100	100	100	100	X	
DBFOO	2003-present	2	BC	formal	100	100	100	100	100	100	X	
DBFOOT	1997-present	8	BC	informal	50	90	100	95	75	75	X	
DBFOOT	1992-present	13	ON	formal	75	95	50	80	90	50	X	

Identification of Risk

Formal risk identification method	52%
Informal risk identification method	26%
No method of risk identification	22%

A formal method of risk identification includes a process by which the services of a consultant, lawyer, or independent advisor were used to assist the public sector specifically with identifying the risks and mitigation options involved in a P3 project. Formal risk identification was initiated by the public sector, and was completed prior to entering into negotiations with the private partner.

Informal risk identification includes discussion that arose as a result of common sense intuition or experience with traditional procurement processes that the partners brought to the negotiating table. For example, the traditional construction procurement contracts involve a fairly standardized risk evaluation, which though not formal in terms of the P3 context, does succeed in identifying some of the risk involved. Informal risk discussion also arose as negotiations evolved, rather than a specific intent to address risk.

Participants who did not have a method for risk identification articulated several reasons for this occurrence: it simply wasn't discussed (though not out of intent to avoid discussion), there was not a clear understanding of what a P3 was and thus risk was not addressed, and because there was significant trust in the expertise and abilities of the partners, thus the risks involved were assumed to be common sense.

A total of 78% of participants used some method of risk identification, whether formal or informal, including the two projects that failed.

Quantification of Risk

Participants who attempted to quantify risk	30%
Participants who did not attempt to quantify risk	70%

Despite 78% of participants having some sort method in place to identify risk, few participants attempted to quantify the value of those risks. However, most participants made a distinction between risk that is quantifiable, and risk that is not. For example, though still a complex process, the calculation of costs associated with projected revenue, inflation, interest rates and financing requirements is far more straight-forward than the calculation of costs associated with regulatory or social changes. In situations where independent advisors were responsible for risk assessment, the participant was not aware of how the risk was quantified but was aware that an attempt at quantification was made.

Participants who did attempt to quantify risk commented that there remained a distinction between the risk they successfully quantified, and risks which remained immeasurable such as social and political risk. Only one participant described an attempt to quantify all risks by using models from the UK to guide them through this process. In all cases where an attempt to quantify risk was made, the assistance of quantity surveyors, independent advisors and consultants was sought.

Participants who did not attempt to quantify risk explained that risk they dealt with could not be valued in financial terms. Several participants commented that they based their assessment of risk on "a gut feel of whether it was a good deal". In one situation, the project's primary concern was ensuring the general public's satisfaction that public safety was preserved. Thus, this project evaluated this social risk in terms of

"priorities and impacts". Neither project that failed attempted to quantify risk, though each cited risk as a primary reason for project failure.

Determination of Risk Transfer

Based on expertise and ability of partners	22%
Based on economic efficiency	22%
Based on public stewardship expectations	9%
Based on consultant recommendation	13%
Unknown	34%

While some participants articulated that risk was transferred to the partner who was believed to have the greatest expertise and ability to control the risk, others based their decision on economic efficiency: it was determined which partner could manage the risk at lowest cost, and risk was transferred to this person in order to increase the value for money proposition of the project. Stewardship expectation refers to the requirement that the risk is expected to be held by the public partner. For example, it was felt that public safety is a service the public sector is expected to provide, thus the basis of the decision to transfer risk was to ensure this expectation was met.

The decision to transfer, retain or share risks varied with each project. Most participants articulated that various professional bodies had their own requirements and standards of operation and service, such as the College of Physicians and Surgeons, and other self-regulating professionals. These and other environmental and regulatory standards identified specific responsibilities that must be assumed by its members.

Contribution to Value for Money

Risk transfer did contribute to the project's value for money	43%
Risk transfer did not contribute to the project's value for money	8%
Unsure/unknown	49%

Of participants who stated that risk transfer did contribute to the project's value for money, 60% articulated specific cost savings. In several cases, the cost of service provision did not require additional funding by the public partner, yet the public partner received social and political benefits as a result of significant improvements to service. In one particular situation, the participant explained that shortly after the partnership began, the project experienced a significant problem that required mitigation by the private sector as per the contract agreement. The mitigation efforts involved a substantial amount of capital investment. While the perspective of the private partner may have been different, from the public perspective this proved that risk allocation did contribute to the value for money, as the public partner did not incur any additional costs.

Another example of costs savings described "significant cost savings over the life-cycle of the project" due to an unpredictable increase in market conditions. In this case, market prices rose drastically leading to increased energy and construction cost to the private partner. Because the requirement to mitigate this risk had been transferred completely to the private partner, the public partner did not incur any additional costs as a result of the market shift.

In most situations where participants were unsure whether risk transfer contributed to the project's value for money proposition, they articulated that they had simply not addressed this question.

Impact on Sustainability

Projects that remain P3s as at time of research	70%
P3s that had completed their contract period	17%
Completed projects that were not renewed as a P3	4%
Failed P3 Projects	9%

At the time when interviews were conducted, 70% of projects were currently operating as P3s. Many of these projects were at some stage of their initial contract period, though others had completed their contract period and were renewed as P3s.

Projects that had completed their contract period were deemed successful because they had served their initial purpose, and there was no need for the project to be continued or renewed. For example, a software development P3 project was no longer required after the contract period because the terms of the partnership agreement had been met, and there were no further requirements for infrastructure or service provision.

Although the initial terms of the contract were met, one project was not renewed as a P3 specifically because it was no longer suited to a P3 structure. In this situation, the public partner described a lack of incentive that would exist for the private partner, which would minimize the motivation to achieve efficiencies and thus decrease the project's potential to achieve value for money.

Of all interviews conducted, only 2 projects were determined to be failures, as articulated by the participant.

Risk transfer impacted sustainability	48%
(Role of incentive 64%)	
(Role of revenue/demand risk 27%)	
Risk transfer had no impact on sustainability	22%
Impact cannot be determined at this stage	30%

Participants who believe that risk transfer did have an impact on sustainability, consistently mentioned the role of incentive in enhancing the motivation to provide effective risk mitigation techniques. For example, the partnership of one project involved a user group who had a strong desire to protect their interests. This user group thus became involved in the project and thus had strong incentive to ensure that risks were effectively mitigated and service provision was of high quality and efficient. As a result, the project has been sustainable to date.

Another participant described the incentive that occurs by linking the project tasks together. The private partner was responsible for designing, building, and operating a facility, and required operating revenues to be realized in order to meet their debt obligations. The private partner thus had great incentive to design and build the project as quickly and as efficiently as possible in order to begin generating revenues. Because the same private party was operating the facility, the quality of design and construction was not jeopardized, and high quality service provision was ensured. Others cited that while project services continue to be available, costs to the public sector have not increased resulting in greater potential for long-term sustainability and even growth. Technological changes and updates, for example, have been required to ensure adequate service provision, however in many situations these costs have been absorbed by the private partner. Had the public partner been required to finance these expenses, it would be unlikely that the services could have been provided at all, let alone at the expected level.

Another trend that became obvious was the role that revenue and demand risk played on project sustainability, mentioned by 30% of participants who believe that risk

transfer did impact project sustainability. Each of these participants indicated that they had either underestimated the significance of this risk, or that their estimates of this risk had great impact on the project's ability to realize its projected return benefits to the partnership. For example, a conservative forecast of revenues ensured that the project would be financially viable, and when actual revenues materialized they were much greater than forecasted, allowing the partners to meet their debt obligations much more quickly. In turn, this minimized the risk of future financial difficulties.

Both projects that failed stated very clearly that revenue risk was a critical factor in the demise of their projects. Both described a situation in which forecasted revenues weren't realized, which caused the risk of financial default to occur and ultimately, the cessation of service provision. In fact, unrealized revenue was the cause of both projects moving back to public ownership and operation. In each case the private partner was unable to meet its debt obligations or provide services at costs that were acceptable to the public.

Participants who replied that the impact of risk transfer on sustainability could not yet be ascertained felt that impact on sustainability could best be evaluated once the contract period had been completed. At that time, a complete assessment of the project and risk mitigation efforts required could be made. The median length of the contract period was 18 years, yet the median length of the projects was only 7 years. Thus, on average the projects were still in the first half of their contract life at the time the interviews took place.

Changes to Risk Allocation

No change in risk allocation since initial partnership agreement	76%
Changes made in risk allocation since initial partnership agreement	24%

Participants who have not changed risk allocation since the initial partnership agreements made few comments other than the obligation to adhere to the terms and conditions of the contract, and concern that the contract be reopened for negotiation. Despite the fact that the public partner may benefit from a change in risk allocation, the concern was that renegotiation opens the door for all partners to voice their concerns. This renegotiation process could negate the very intent of signing the contract and determining specific risk transfer arrangements. However, one participant brought up an interesting dilemma: whether the contract should be adhered to even adherence places undue pressure on the partnership. In this example, there were significant unanticipated market changes that were the contractual responsibility of the private partner. However, to hold the partner to the terms of the contract would likely jeopardize the health of the partnership relationship, and could result in consequences far worse than renegotiation of specific costs and risk allocation. In this sense, there was a need to balance the needs of the project with the needs of the partnership.

The two projects that failed experienced significant risk allocation changes due to their complete assumption of ownership and operation of the project. Other participants who experienced a change in risk allocation discussed renegotiation processes that were provided for in the partnership agreement. Renegotiation processes were built into the contract to account for unforeseen circumstances such as distinct market changes (eg.

increased utility costs), and increase in project scope (usually requested by the public partner). One project for example, experienced significant delays yet was able to mitigate the costs of these delays through renegotiation as per terms of the contract. When asked if concerned about the nature of the negotiations, one participant described that the contract is meant to be interpreted in the "spirit and meaning" of the agreement.

General Comments

Management of social and political risks is critical	44%
Management of revenue/demand risk is critical	22%
Incentive is critical in overall sustainability	30%
Overall risk awareness in project management is increasing	26%

Several recurring themes arose from general discussion with participants: the role of social and political risk, revenue/demand risk, the importance of incentives, and the nature and evolution of risk evaluation in any type of project assessment.

Although actual risk may be transferred to the private sector, often the perception is that the public sector remains in control of a project. For example, one project experienced delays in construction, and despite the responsibility for delays being fully held by the private partner, the tendency was to hold the public partner fully accountable. In this situation, the public partner decided to intervene in order to mitigate the potential political risks that could have put an end to the project's development. Another participant described a P3 project which was initiated shortly after a very visible community incident, thus the political and social sensitivity to service provision was extremely high. Mitigation of social and political risks required a highly-coordinated approach, and significant effort.

Several participants mentioned the importance of addressing social and political risks not only during the stages of project development, but prior to the project initiation. Without spending considerable time and effort mitigating social and political concerns, the project may be not pursued at all. For example, one participant described a pre-commitment period of 7 years before social confidence was gained, after which time the project was pursued.

There is often significant political risk held by the public sector, and these risks need to be weighed against quantifiable risks when determining project sustainability. For example, if public safety is a key element of service provision, the public partner may determine to retain that risk despite the potential for risk transfer would increase the value for money. Political risk can also arise due to regulations, as in the case of one project where in order for it to be pursued, the municipality was required by their community charter to guarantee the public sector's financial commitment to the project. Thus, inherent in the decision to pursue the project was a significant acceptance of political risk by the public partner. Another participant described a situation in which the P3 project was pursued strictly due to political pressure with no assessment of whether the project was best suited to a P3 structure.

Incentive also plays a significant role in how participants felt risk transfer impacted sustainability. Incentives that are embedded by bundling various tasks are considered to be significant motivators for the private partner to meet the terms and conditions of the contract, and for bringing innovations and efficiencies to the project. As described earlier, if a partner requires operating revenue to meet its debt obligations, it will be more motivated to complete the design and construction efficiently and

effectively in order to realize operating revenues as quickly as possible. In conjunction with penalties for delays and cost overruns, some participants articulated the need to also offer bonuses and other incentives if targets are exceeded.

One participant described a project that required the private partner to develop a new data management technology. The private partner was given the advantage of collecting all revenues that could be made as a result of broader commercial applicability. This provided great incentive for the private partner to not only ensure that the technology was effectively designed and constructed, but also due to the potential to receive even greater returns on their investment.

Finally, several participants mentioned the increasing level of awareness with respect to the role of risk assessment in project management. For example, there has been more focus on assessing and managing risk with the increased use of systems such as the Enterprise Risk Model, and various other risk assessment tools. This evolution of risk awareness is emphasized by the P3 structure because a P3 requires that realistic estimates of risk be made up front in order to assess the true life cycle costs of a project. One participant articulated the belief that this focus on risk assessment assists projects in determining whether they are suitable candidates for a P3 model. Several participants mentioned that their awareness and abilities in managing risk have increased with experience. In one case, a project experienced two failed RFPs, and by the time the third RFP was secured their identification, assessment, and determination of risk transfer was far more comprehensive than both previous RFPs, which they believed to be a critical factor in the project's sustainability to date.

7. DISCUSSION

A literature review was completed to determine if a recommended model of risk transfer exists. This literature review focused on the compilation of data primarily from Partnerships Victoria (Australia) and UK sources because of the longer period of experience with P3s in those jurisdictions. These sources do establish a recommended risk model. This model was based on the public partner's preference for risk allocation, and with limited exceptions involves the complete transfer of each risk in the model to the private party.

To determine whether the methods of risk transfer in Canada follow this model, information regarding risk and risk transfer was collected through contact with key senior personnel having involvement in a range of 23 Canadian P3 projects. These participants represented projects over ten industry sectors, and included projects that involved various levels of government. The information provided by the participants was collated and compared to the recommended risk transfer model. It was also used to identify how risk transfer occurs in Canadian P3 projects and to investigate whether or not certain patterns of risk transfer led to greater sustainability.

The data collected through this research of Canadian P3s indicates that the primary reason for transferring risk is to capitalize on the private partner's efficiencies and expertise in mitigating risk. Thus, the method in which risk is transferred to the private partner is critical to achieving all anticipated efficiencies and cost savings.

The information collected indicates that in those Canadian P3s, of the 23 projects there exist 15 different risk transfer models. Eight of the projects use risk transfer models which conform to the recommended risk transfer model. The remaining 15 projects

involve models which transfer less risk than the recommended model. No apparent pattern is observed between risk transfer, industry sector, and P3 model. For example, four Design/Build/Finance/Operate contracts transferred risk differently than one another despite operating within the same P3 model structure. This result points to the conclusion that risk transfer is determined on an individual project basis, requiring each project to carefully consider its own risk situation and to determine its own optimal level of risk transfer.

The data also indicates that 78% of P3 projects studied have been sustainable. The two projects that failed did so because the private partner was unable to realize forecasted revenue, and as a result were no longer able to finance their debt obligations. These failed projects operated in different industry sectors, followed different P3 model structures, and differed from each other in their method of risk transfer. There were no similarities between the two projects that failed. Also, successful P3s were noted in the same industry sectors and type of P3 model as the two project failures.

P3 projects in Canada are still very new, many being only one-third to one-half into the duration of their contracts. The results to date indicate that most projects have successfully endured to this point, regardless of the method of risk transfer involved.

Data from 12 different P3 models has been collected, 11 of which have been associated with successful projects. This observation leads to the conclusion that the type of P3 model used has little impact on project sustainability.

In addition to the data collected regarding risk transfer models, several other ideas and themes became apparent through the course of completing the interviews.

Social and political risks should not be undervalued or underestimated simply because they are difficult to quantify. In fact, these risks may be far more influential than anticipated, and require highly coordinated efforts to mitigate.

Incentives also play a key role in a P3's contribution to value for money, and may play a key role in a project's sustainability. As one participant articulated, at the end of its contract period the P3 was not renewed because the incentive for the private partner to operate efficiently no longer existed. Thus, value for money would not be enhanced by continuing the project using a P3 structure. The ability of some projects to embed incentives into the contract appears to have enhanced their sustainability.

The lack of a standardized approach to developing P3s, creates a need for expert knowledge and skills in order to improve the partnership's ability to address the unique characteristics and needs of each project. As previously identified, 78% of participants articulated that they used some form of risk identification in the process of establishing their project. However, only 52% of these people had a formal process in place. Considering how quickly P3s have developed in Canada over the past 10 years, the trend to bundle more project tasks and assign these tasks to a consortium of private partners is likely to continue. As the private sector increases its investment in P3 projects, the contract length is likely to remain high: between 15-35 years in order for the partners to achieve a return on their investment. This long contract duration will thus mean a greater exposure to risk, and a greater need to manage the risks effectively.

While the results of this study do not make a distinct correlation between how risk is identified and the success or failure of a project, it was indicated that the length of the contract period may also play a significant role in project sustainability. Of participants

who had a formal method of risk identification in place, the median contract length was 20 years. However, the median contract length was only 8 years for participants who identified risk through informal methods. This result suggests that long-term contracts require a more thorough evaluation of risk due to the inability to forecast risk accurately over a long period of time.

The number of P3 projects in Canada is rising quickly. This will result in much closer scrutiny of P3s development, and the promise that P3s can provide value for money will be more closely evaluated. For this reason, it will be important to quantify risk wherever possible to enable the most accurate determination of whether true value for money can be achieved. Recent projects include substantial amounts of investment from both the public and private partners, such as hospitals, schools, and primary transportation links, and the general public will demand higher accountability and transparency surrounding value for money calculations.

8. CONCLUSIONS AND RECOMMENDATIONS

This study did not find conclusive evidence that an optimal model of risk transfer exists within the Canadian context of P3s, nor did there appear to be a significant link between a particular model of risk transfer and sustainability. However, some conclusions and recommendations can be made.

Canadian P3s transfer risk in many different ways, and many projects that involve different patterns of risk transfer have been sustainable. Also, risk allocation is not dependent upon the type of P3 model being used, and risk should be allocated to meet the demands of each individual project.

As the private sector continues to assume responsibility for more project tasks, there will be a greater requirement to assess, value, and determine allocation of risk, and to do so as effectively and as efficiently as possible in order to provide value for money.

With the increase in number of P3s being initiated in Canada, a larger database will be established that will provide a much broader research base for future studies regarding the intricacies of P3s.

Potential partners of P3s need to allocate risk on the basis of the best combined judgment of the partners, recognizing that the most appropriate risk allocation model appears to be project specific. Therefore, precedent projects can provide useful guidance, but should not be considered to be binding or limiting in any way.

Based on the data collected, P3s in Canada are highly successful (78%) even in these initial years of experience. Therefore, public sector proponents of projects should proceed with confidence when considering the P3 approach to project/service delivery.

Experience indicates that there is a higher risk to sustainability, where sustainability depends on long-term revenue flowing to the private sector. Therefore, when P3s are established particular care must be given to forecasting revenues to ensure that this risk is minimized. A formal risk assessment should be completed, with the assistance of those who are experienced and have expertise specific to the nature of the project.

The longer the duration of the project term, the more likely it is that the agreement will require revision as time goes on. All renegotiations should be conducted in the spirit of the initial partnership agreement to ensure the sustainability of both the project and the partnership.

In summary, there does not appear to be an optimal model of risk transfer that leads to greater sustainability. Risk should be identified, valued, and transferred as per the demands of the context and unique characteristics of each individual project.

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